

REMARKS

Claims 1-9 remain in the case.

1. The specification is amended to provide the patent number of the parent application.

2. Claims 1-8 were rejected under 35 U.S.C. 102(b) as anticipated by Hirano et al. '321 (US Pat. 5,561,321). The rejection is respectfully traversed.

The present invention relates to an adhesive composition for bonding two or more kinds of different members. The composition is made of a brazing material and a particulate material that reduces thermal stress. In addition, the invention relates to a composite member that is made of two or more kinds of different members that have differing thermal stress values. These different members are bonded with the adhesive material described above.

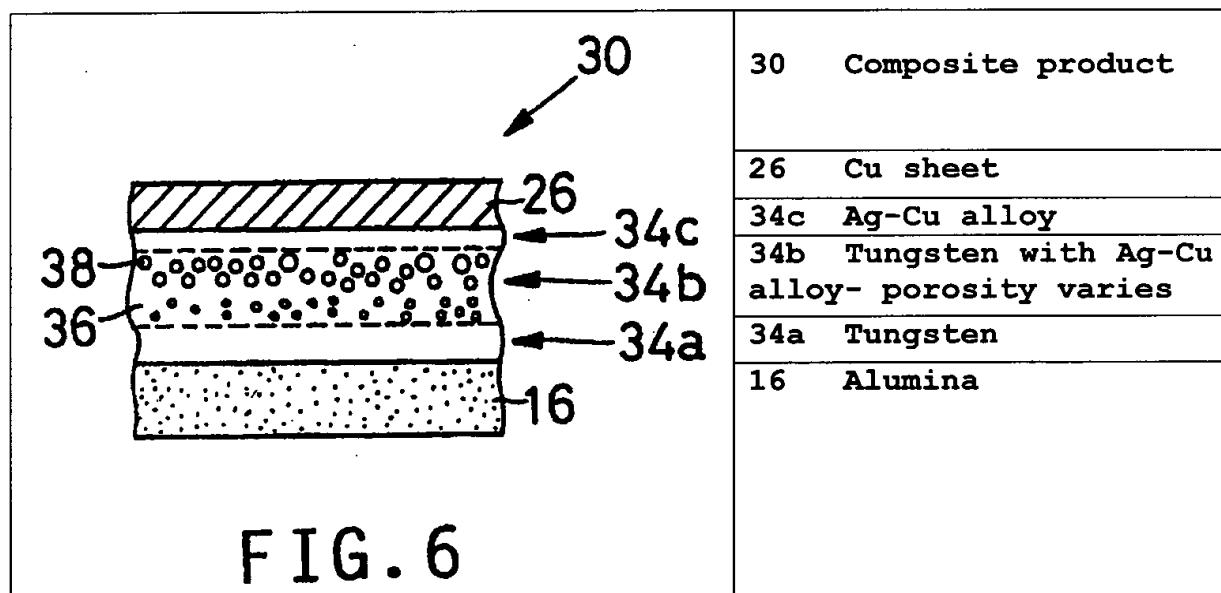
The adhesive composition bonds two or more kinds of different members. The composition, due to its makeup, maintains a proper bonding strength without causing a phenomenon, due to thermal stress formed during the cooling operation after bonding at high temperatures, of reduction in



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bond strength at or around the bonded interface, or the occurrence of cracks at those members that are easily damaged by thermal stress during a cooling operation. The resulting product is a composite member formed of members bonded using the claimed adhesive composition. There is no teaching of this unique adhesive composition or the resulting composite product in Hirano et al. '321.

Hirano et al discloses a ceramic-metal composite structure illustrated in Fig. 6, copied below with legends added on the right side.



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The composite substrate 30 is made of an alumina substrate 16, a metallic layer 34, and a copper sheet 26 bonded to the alumina substrate 16 via the metallic layer 34.

The metallic layer 34 has three sub-layers.

1. The lower tungsten sub-layer 34a has a low coefficient of thermal expansion.

2. The middle layer is a tungsten/silver-copper alloy mixture sub-layer 34b having an intermediate coefficient of thermal expansion.

3. The top silver-copper alloy sub-layer 34c has a higher coefficient of thermal expansion.

In the middle sub-layer 34b, the ratio of the percentage content of the silver-copper alloy to the tungsten content increases with distance from the alumina substrate 16. Thus, in layer 34, circles 38 are representations of various concentrations of Ag-Cu alloy and the larger circles (i.e. the higher concentrations) are at the top showing the higher percentage content of the silver-copper alloy is at the top rather than at the bottom, which has the highest concentration of tungsten.

Thus, the "adhesive composition" 34 in Hirano et al. '321 is not a simple composition of a brazing material and a particulate material that reduces thermal stress, but rather is a complex three-layer material system requiring a top layer 34c of Ag-Cu alloy, a bottom layer 34a of tungsten and a middle layer 34b having a mixture of tungsten and an Ag-Cu alloy where the two components are arranged in a gradient concentration, see Fig. 6.

There is no teaching of the adhesive composition of claim 1 having only a brazing material and a particulate material to reduce thermal stress without the required top and bottom layers 34a and 34c; there clearly is no teaching of the preferred composition of claim 2 where:

- a) the base metal for the brazing material is Au, Ag, Cu, Pd, Al or Ni, and
- b) the particulate material is either a ceramics fine particle, a cermet fine particle, or a low-expansion metal fine particle.

Accordingly, review and reconsideration of this rejection are requested.

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3. Claim 9 stands rejected under 35 U.S.C. 103(a) as unpatentable over Hirano et al. '321 for the reasons stated on pages 3 an 4 of the Office Action. This rejection is traversed.

The Examiner admits that Hirano et al. '321 does not disclose the composite member for gas separation tubes. Because as discussed above, the reference fails to disclose the composite member of claim 4 with its unique adhesive composition, the reference also fails to teach the composite member of claim 9. Accordingly, review and withdrawal of this rejection are also requested.

Applicants respectfully submit that the present application is now in condition for allowance. Accordingly, the Examiner is requested to issue a Notice of Allowance for all pending claims.

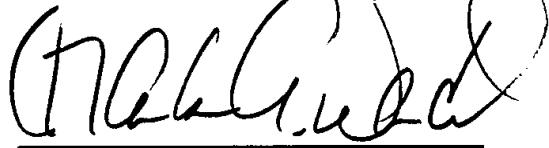
Should the Examiner deem that any further action by the applicants would be desirable for placing this application in even better condition for issue, the Examiner is requested to

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telephone applicants' undersigned representative at the number listed below.

Respectfully submitted,

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